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The Citrus Industry
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Melvin, C.T.

C. T. MELVIN

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# A General Survey Of Florida Soils

Soil Surveys

By O. O, Bryan

Regardless of the method employed in attempting to solve our varied economic problems it is not possible to ignore the part played by the soil. The deep-seated influence of the soil on society is ever with us and in recent years the magnitude of its influence has been felt in many walks of life.

Soils differ in their inherent capacities to produce crops. These differences are usually beyond the control of man. In recognition of these principles the Federal and State governments have attempted to ascertain the inherent soil values in a broad scale over the country during the past year. This type of information is necessary before a sound agricultural program and land use policy can be furnished.

Because of the limited knowledge concerning the soils in Florida it became necessary to make a general soil survey of the state in order that a more intelligent land use program could be inaugurated. This survey had for its purpose the location of the important soil types together with their characteristics and crop adaptation. While the survey is necessarily general it does give sufficient information for starting a broad land-use program in the state. With so much of the area in Florida not adapted to cultivated crops at present, a survey of this kind will be of invaluable help in the planning of a program for game reserves, forestry, recreational grounds, as well as agricultural land.

Since the second and third class soils can no longer be successfully farmed it becomes more and more necessary to point out the qualities that determine our best grade farm lands. With only about 25% of Florida adapted to agricultural crops it would be reasonable to assume that the grades or land inherently suited to cultivated crops should not be considered for game preserves or forestry, or recreational grounds.

The survey reveals that about one-half of the state is classified as well drained upland soils. This includes the greater part of the western counties and an area extending south through the central part of the peninsula, known as the ridge section, as far as Highlands county. The eastern area of the poorly drained lands consists primarily of the St. Johns and Kissimmee river valleys and that part of the state extending east and south of these valleys to the coast. The area also extends west to Columbia county, and includes part of Alachua and Clay counties and all of Baker, Union, Bradford, Duval, and Nassau counties. The poorly drained areas west of the ridge consist of the Peace river valley and south to the coast, the Withlachoochee river valley and parts of the Suwanee and Steinhatchee river valleys, and parts of the gulf coast counties as far west as Bay county.

The well drained soils in the central part of Florida, commonly known as the ridge section, consists mainly of Norfolk, Eustis, Gainesville, Hernando, Orlando and Ft. Meade sands and fine sands, with the Norfolk types predominating, underlain by a yellow friable sand. The Eustis soils differ from the Norfolk soils in having a reddish-yellow color, especially in the underlying material. These types of soils have good air drainage and are well suited to the production of citrus, when properly managed, in spite of their poor natural fertility.

The Orlando and Ft. Meade soils have a higher content of organic matter than do the Norfolk soils, and for that reason are better suited to the production of truck crops. The air drainage is not always good, especially on the Ft. Meade types, hence they are not very well suited to citrus. The Orlando soils are characterized by a black surface which extends 12 or more inches in depth. This layer overlies a pale yellowish-gray sand, while the Ft. Meade soils have a black surface, of similiar depth, but the lower horizons pass into a phosphatic clay.

The Gainesville and Hernando

(Continued on page 20)

Botanical Chemistry



# The Vital Role Of Chemistry In Determining Essential Materials In Plants

By W. A. LEUKEL, Agronomist

Many useful products used in the various industries, agriculture and in the domestic household are produced from plant materials. In the discovery and manufacture of these various products chemistry has always played a vital part. Hardly a phase of plant development can be considered but that the problems involved are not highly chemical in character and require the services of men with chemical training. In addition to chemical training the worker must be well versed in the growth behavior of plants. This includes the physiology, anatomical structure, morphology and many other phases of plant growth behavior. Plants are living things and the materials that constitute their make up are ever changing as they pass from one growth stage to another.

The preparation of plant material for laboratory analysis is as important as the laboratory procedure itself. In the first place, the difference in the composition of the plants at different growth stages and that of the different plant parts at these growth stages must be considered. In the second place, the problem of preserving plant material so that its composition obtained by analysis will be the same as that of the growing plant when harvested is of vital importance. Much time and money in the past has been uselessly spent in the analysis of plant material by not taking the above parts into consideration.

In preparing and preserving plant material for laboratory analysis certain definite procedures are generally followed. In the first place, the live plant material must be killed as quickly as possible so as to obtain a composition analysis similar to that which occurs in the living plant. This is especially true when determining the organic compounds of the plant such as sugars, dextrins, starches and many others too numerous to mention here. Plant material is generally killed by cutting it into short sections and then immersing it in boiling ethyl alcohol and boiling it for a short period. After this procedure the container is sealed and the material may be preserved in this way for later analysis. Another method generally followed is to cut the material into short sections and expose it to a high temperature of 100°C for about 20 minutes. This temperature kills the plant material or stops all biological processes in the plant. After this, the temperature is dropped to about 70°C and the material is dried in a ventilated oven. This drier is equipped with a motor driven fan which keeps a constant current of hot air moving over the plant material for a rapid removal of moisture. When the material is in a dry brittle condition it is ground to a fine powder and preserved in a sealed container for later analysis. Temperature regulation during the above procedure is important. Too high a temperature often changes the nature of many organic compounds resulting later in an incorrect composition analysis. Fats are often oxidized and sugars carmalyzed. Other compounds like starches and dextrins undergo transformations at too high temperatures.

Many nitrogen compounds are hard to obtain an accurate analysis of if preserved by the above methods. These compounds are often determined on the fresh green plant material. In this case the material is chopped up fine and passed thru a power food chopper and then ground fine in a large motor with sharp quartz sand. The soluble nitrogen compounds are then extracted with water from this finely ground material. The material in solution or suspension is then subjected to laboratory procedures. If considerable material is to be analyzed it may be preserved by freezing immediately after being harvested and cut into small parts. This frozen material can then later be ground in a mortar and treated similar to the fresh material.

The various organic compound in a finely ground plant material are determined by various methods of extraction with different reagents. For example — fats and oils are extracted with ether. The sugars are then extracted with diluted alcohol, 90%. Dextrins are extracted with more dilute alcohol, 20%. Starches are obtained thru use of an enzyme known as disease. After this the higher carbohydrates are separated by hydrolysis with acids. The crude materials like lignin and cellulose are later separated by the use of strong acids and alkalis.

The various nitrogen compounds are separated thru precipitation with various reagents and filtration procedures. The nitrogen in each of these various compounds is later determined by digesting in boiling sulfuric acid mixed with special salt reagents. Final determinations are made later by titration or by weighing the final product on a very delicate balance.

Mineral compounds are determined usually from the ash of the plant material. For this purpose plant material is reduced to an ash in a muffle furnace. This furnace must be kept at definite temperatures for certain mineral materials. Some are more volatile than others. Too hugh temperatures are detrimental for determinations for certain compounds as phosphorous, iodine, etc. Often plant material is ashed by digesting the same in acid mixtures such as hydrochloric, sulfuric and perchloric acids. This procedure oxidizes the organic material and leaves the ash residue. The ash is later dissolved by acids and the different minerals determined by various laboratory procedures. These procedures as in the case of organic compounds, include precipitatation and titration methods too numerous and complicated to be given in detail here. Besides these regular laboratory methods employed, many compounds are determined by means of color reactions. The amount of a certain compound in a sample by this method is determined by the intensity of color produced by the compound when compared with a standard color. The microscope is also employed in many cases to determine the identity of certain compounds.

It can well be claimed that in the field of chemistry all sciences find a common meeting place. In interpreting the results of chemical investigation the worker must use mathematics, physics and various other sciences. In almost every field of agricultural research, chemistry is being used to pave the way for a clearer understanding of the results secured. Hardly a phase of plant development can be considered but that the problems involved become highly chemical in character. The chlorophyll of the plant which is often designated "the president of the powerful photo-

electric system of the plant" utilizes the energy of the sun by a process known as "photosynthesis." As a result of this process carbon dioxide from the air and the water from the soil are combined to form the various carbohydrates of the plant. Among these are found the sugars, dextrins, starches, celluloses and other fibrous structural materials. Approximately 85% of the material in the plant is elaborated thru the activity of chlorophyll. Animals subsist on plants which in turn utilize the service of the chlorophyll. "Chlorophyll in reality may be called the most important organic compound for it has made life as we know it on this earth," within this chlorophyll, chemical changes takes place. Starch is formed in some of the chloroplast cells while others are charged with sugars. Secondary to and accompanying these there is possibly the flux of nitrogen and the formation of proteins. Associated in family connections with these are the carotenoids. The pale yellow substance derived from the carotene is our vitamin A. From a chemical study of the reactions and composition of the chlorophylls the chemist now knows how to manufacture this all important substance. This relation of vitamin A to natural pigments of the carotene and related groups, which are considered biochemical, now becomes a chemical problem of outstanding interest. Vitamin C has recently been identified with ascorbic acid and a structural formula for it has been assigned.

The relative composition of plants at different growth stages and the nutrient requirements of the plants at these different growth periods have been determined thru the medium of the bio-chemical laboratory. This information thus obtained, is of great value, for a more intelligent use of fertilizing materials for the better growth of plants. It further indicates at what growth periods different plants are best suited for feeding purposes. With a knowledge of the normal composition of plants the feeder can often determine what plants are deficient in the essential elements for feeding purposes and so supply the needed supplements. In determining the feeding requirements of animals the bio-chemical determines the composition of the feed given the animal and later does the same on the feces and urine expelled from the animal body. A comparison of these two analyses show what the animal has utilized. This information makes possible the formulation of feeding rations for different animals and tells what feeds are appropriate to provide these rations.

Many of our drugs used for medicinal purposes are extracted from plants in which chemistry plays a major role. The control of plant diseases thru the preparation of insecticides and fungicides which kill plant pests and at the same time are harmless to plants and man are mainly in the field of chemical research. A conspicous example of these are the pyrethrum poisons.

The plant breeder in building up plants of desired composition for various purposes uses the chemical laboratory to measure the results of his efforts. In this way he determines the increase in the oil content of peanuts, the starch of corn, the sugar of cane and sugar beets, the proteins of wheat and the variation of various other compounds in different plants as a result of his breeding operations.

Chemistry not only aids in the production of a higher grade or quality of plants but it helps to utilize farm products as potential raw materials for other industries. Cotton, one of our chief textile materials for cloth and other uses, must be processed by the chemist according to certain washing, bleaching and dyeing processes. With the development of the tire industry more of this cotton must be processed each year to meet the requirements for cordage in tires. Some of the lower grades of cotton known as "linters" are processed for the production of explosives as nitrated cotton or gun cotton. Now more cotton is being utilized by the various synthetic processes for the production of rayon and a new type of paints or lacquers such as Duco and also in the plastic industry. From the seeds of the plant the oils are extracted and used for the production of edible oils such as salads, the hydro-genated products such as crisco, and for manufacture of soap, a by product from which (glycerine) has many uses, especially as a basic material in the production of explosives (nitro-glycerine), medicine, antifreeze and synthetic resins (glyptal) used in the production of enamels, varnishes and plastics. Corn which was chiefly grown for feed now as a result of chemical research is the basis for many commercial products such as: corn, oil, starch for the textile trade, salad oils, dextrine for paste, corn syrup and many others. Then the cellulose from corn husks and stalks, a potential material for paper pulp and for building insulation boards; likewise from oat hulls, has been developed an important chemical solvent, furfurol from which a valuable type of plastic is prepared in large quantities for the manufacture of victrola records and similar products. Levulose one of the digestive products of cane sugar is a valuable food 1½ times as sweet as cane sugar. It is used as a preventive or a treatment of diabetes. It occurs in quantities in the wild flower and the Jerusalem artichoke. An experimental chemical plant for the production of levulose has been established at Ames, Iown.

The fruit of the tung oil tree is used in the production of valuable oils and varnishes. The pine and poplar trees have been utilized for the production of paper pulp. By new processes the chemist is ever busy with research on other farm products so as to make them a valuable source of revenue for the farmer. Increased production of farm products must be met by increased uses for such products.

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Plants, Diseases & Pests



# Plant Diseases In Florida

BY ERDMAN WEST

Wherever plants are growing we find plant diseases. The more favorable the conditions are for plant growth, the more plant diseases are likely to be found. Florida with its warm, humid climate and abundance of plant life has many plant diseases to contend with.

Where large areas of one crop are grown for a long period of time, the loss from diseases alone may be very considerable. Take, for instance, our winter tomato crop grown at a season when diseases should be least important. In 1934 there was an estimated loss of 16 per cent of the crop. In other words out of every six bushels of tomatoes raised last year, one was thrown away or never grew. The same was true of our potato crop and our green beans. The loss from corn diseases was even greater, for here the loss was one bushel in four. These losses occur nearly every year. Many of them are held down to this figure only by the proper use of fungicides and crop rotation.

Plant diseases some times assume more serious proportions and demand more heroic measures. Several years ago the shade tobacco crop of West Florida was threatened by a new disease called blackshank. An Experiment Station worker discovered that a fungus living in the soil was the cause of the trouble, but that fact was of little use since the disease did not yield to the ordinary methods of control. During the next few years a new variety of tobacco was bred that was resistant to this disease. That is, the new tobacco could be planted in infested soil and produce a crop in spite of the presence of the disease. This is one method of fighting plant diseases—the development of a resistant variety.

Among the beautiful ornamental trees of South Florida, the coconut palm ranks high. About ten years ago the coconuts were threatened by a new disease called bud-rot. Hundreds of specimen trees died, ruining the landscaping of beautiful homes and estates. After the cause of the trouble had been ascertained to be a fungus, it was found that spraying would not control the trouble. Officials decided that the disease could be eradicated. An inspection system was instituted and every palm bud-rot was cut out and destroyed just as soon as the disease could be diagnosed. For several years, no sign of the coconut bud-rot disease has been found. Here we have iillustrated another method of fighting plant diseases—the eradication of the organism causing the trouble.

More recently an investigation of a certain serious celery disease disclosed two important facts. The trouble was a viraus disease and it lived also on a weed common around celery fields. The disease was carried from diseased weed plants to healthy celery plants by a certain sucking insect. Spraying for viraus diseases is not effective. It is expensive and perhaps impossible to keep out all of the insects by the use of insecticides. However, the elimination of the weed from the adjoining fields and fencerows did control the trouble. Without the alternate host to live on while the celery fields were vacant, the disease had to disappear. Here is another method that has been used to control Florida plant diseases — the eradication of the alternate host of the cause of the trouble.

Almost every crop has at least one disease to cut down the yield and some have several troubles. Some diseases attack only one crop and have no effect on any others. On the other hand, some fungi are capable of attacking almost any plant when conditions are favorable. Almost every plant, wild or cultivated, that grows in Florida, has some pest. If the plant is an economic crop plant or an ornamental plant, it is easy to see that the disease is important. If the plant is a weed or otherwise insignificant, the trouble may still be important, in that such diseased weeds may be centers of infection allowing the disease to spread to economic crops.

A disease may occur on any or all parts of the plant. Sometimes it is confined to the leaf or stem or roots, or it may infect all of these. The fungi causing some diseases are superficial, growing on the surface, while others are deep in the tissues; and some are systemic, that is distributed all through the whole plant. Some diseases are important at only one stage of plant growth such as the seedlings diseases, while others attack the plant at any and all stages in its life history. All of these various factors must be sought out and studied, so that we may ascertain the whole history of the disease and attack it when and where it is weakest. An exact determination of the cause of the trouble is necessary, since some fungi yield more readily to specific fungicides than others.

Florida's plant diseases offer the grower and the investigator many unique and difficult problems. Many northern crops are grown in Florida, especially in the northern and central parts. These plants usually bring most of their troubles with them and in addition contract some more tropical kinds that they do not suffer from in the north. In the southern part of the State, many subtropical fruits and crops have been established on an experimental or a profitable basis. Due to our cooler or different climatic conditions, the plants may become susceptible to some of our own pests or develop a new set of troubles. In other words, Florida is a meeting place of temperate and subtropical diseases, as well as plants and crops.

Nevertheless, the outlook is not as pessimistic as you might surmise from this drab cataloging of plant troubles. Many of our important diseases are well understood and their control is a routine procedure in the annual care of the crop. Many others cause serious damage only occasionally. A great many occur on inconspicuous or unimportant plants. The remainder are being attacked by State and Federal plant pathologists, who are always willing to help you, if you will but tell them your troubles.

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# Florida Economic Plants In Relation To Their Importance

BY C. V. NOBLE

I have been asked to discuss with you the relative economic importance of Florida plants. Without doubt, Florida's most important group of plants from an economic standpoint is her forest trees. Between two-thirds and three-quarters of the total land area of the state is devoted to forestry. We are rapidly obtaining more and fuller information concerning our forests from the Southern Forest Survey which was inaugurated in January, 1931, by the United States Forest Service and up to April 1 of this year had covered 64 per cent of our state. The preliminary reports on this survey are illuminating. However, it is not the purpose at this time to discuss this type of plants. Still another large area of our state is producing native pasture grasses, the economic income from which is represented by the value of cattle, hog, sheep and goat products derived from these open ranges. Again, this class of plants is not to be discussed at this time. The present purpose is to bring out the relative economic importance of agricultural and horticultural plants that are under cultivation and the important changes that have taken place in recent years.

The Federal census placed a gross value of $36,141,894 on all Florida crops produced in 1909. Twenty years later, or 1929, the corresponding value was $88,397,053, an increase of 145 per cent in value of all crops during the 20 year period. Not all classes of crops increased at the same rate during this period, however, and some showed a decided decrease.

The value of all fruits and nuts (principally citrus) represented 21 per cent of the value of all crops in 1909, but in 1929 the value of fruits and nuts had increased to 53 per cent of the total crop value. In other words, the value of the Florida fruit and nut crop in 1929 was six times greater than the 1909 value.

The second class of Florida crops in economic importance is composed of the vegetables or truck crops. In 1909, vegetables represented 23 per cent of the total crop value. In 1929, they represented 28 per cent of the total crop value. Vegetable crops increased three times in value from 1909 to 1929.

The third class of Florida crops from the standpoint of value is made up of the cereals and other grains and seeds. By far the most important single crop in this class is corn. In 1909 this class of crops led all other classes in value, representing 24 per cent of the value of all crops. By 1929, however, the types of farming had shifted so rapidly to citrus fruits and winter truck crops that cereals and other grains and seeds represented only 8 per cent of the total value. The decrease that occurred in this twenty year period in the value of cereals and other grains and seeds was approximately 15 per cent.

Cotton was a crop of considerable importance in Florida in 1909, being valued at about 5½ million dollars, or 15 per cent of the value of all crops. Due to the ravages of the cotton boll weevil which made its appearance in Florida about 1915, and to the growing importance of citrus and winter truck crops, the total value of the Florida cotton crop had decreased 56 per cent by 1929 and represented less than 3 per cent of the value of all crops.

All types of tobacco represented 3 per cent of the value of all crops in 1909 and had increased to 4 per cent in 1929. In acutal value, however, tobacco has increased about 237 per cent during the 20 year period.

Hay and forage and all other cultivated field crops that have not been included in the classes mentioned were valued at approximately 5 million dollars in 1909, ar 13½ per cent of the value of all crops. These miscellaneous crops had decreased 23 per cent in value by 1929 and represented only 4 per cent of the total crop value at that time.

The winter vegetable and truck crops that have been growing rapidly in economic importance in Florida agriculture represented 28 per cent of the total crop value in 1929, perhaps represent over one-third of the total Florida crop income at the present time. There are over 50 of this type of crops produced commercially in Florida, but the following twelve represent between 90 and 95 per cent of the value of all truck crops, and they are named in the order of their average ten-season value from 1924-25 through 1933-34:

1. Tomatoes
2. Green Beans
3. White Potatoes
4. Celery
5. Strawberries
6. Watermelons
7. Green Peppers
8. Cucumbers
9. Cabbage
10. Lettuce
11. Eggplants
12. Green Peas

To summarize: The fruit and nut crops (primarily citrus fruits) represent over one-half of the total value of all Florida crops. The vegetable or truck crops represent approximately one-third of the total crop income. These two classes of crops have increased tremendously in importance during the past 25 years. The remaining 15 to 20 per cent of the total crop income is derived from the cereals, other grains and seeds, cotton, tobacco, hay and forage and many other minor crops. Most of these crops, tobacco being an exception, have been decreasing rapidly in their relative proportion of the total crop income since 1909.

# Plan And Purpose Of Florida's Agricultural School Of The Air

J. FRANCIS COOPER

Beginning October 1 the Florida Farm Hour is presenting an agricultural school of the air which it is hoped and believed will be of interest to every listener. A series of lectures, one each day except Saturday and Sunday, will review for us every phase of the state's agriculture and bring us the latest information on these different phases.

The lectures are to be given by teachers in the College of Agriculture and their co-workers in the Experiment Station and Agricultural Extension Service. They will be something on the order of classroom lectures, but are to be made more sim-

(Continued on page 21)

# The Citrus Industry

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## WISE AND COMMENDABLE (ed)

Action of the Florida Citrus Commission in extending the maturity inspection date for citrus fruits from December first to December 23 is highly commendable.

This year, as every year, some early shipments of immature fruit got by the inspectors and found its way to Northern markets, to the detriment of later shipments of high grade fruit, but on the whole, the inspection service has been carried on with greater efficiency than in any previous year. Due to the painstaking efforts of the inspectors, backed by the growing sentiment among growers and shippers that none but fully mature fruit should be shipped, there has been less than the usual complaint of green fruit being dumped on the markets.

However, there is still plenty of fruit in Florida which is yet unfit for shipment, and the extension of the inspection service for an additional three weeks beyond the usual closing date is a wise and commendable action on the part of the Commission.

With production greatly reduced from last season's heavy output, with large sums being spent for advertising in consumer markets, the grower has reason to expect higher prices and greater profits than have been realized in recent years—but to secure these prices and these profits it is essential that nothing but fully matured fruit of high quality be offered the consumer. The extension of the inspection service to Dec. 23 will be a material help.

## PROTECT YOUR GROVES (ed)

Any citrus grove which is worth having is worth protecting.

The citrus grove developer who spends his money for the purchase of land and the preparation of the land for planting; who spends additional money for trees and the planting of them, owes it to his grove and to himself to see that his plantings are protected — protected from disease, from insect pests, from starvation, from drouth and from possible injury from cold. This means close attention to cultural methods, the investment of certain sums for insecticides and fertilizers, in some cases provision for irrigation, and adequate preparation for a possible freeze.

As the grove attains age, and through age becomes of greater value, the necessity for such protection increases. Greater sums must be spent to ward off disease and fight pests, more must be spent to provide proper plant food, greater provision must be made to provide sufficient moisture, and greater care is necessary to provide ample protection from frost. Each year added to the life of a new grove planting increases its value and its potential earning power, and each year should see greater provision made for the protection of the grove from possible injury from disease, pests, starvation, drouth and cold.

We repeat. Any citrus grove which is worth having is worth protecting.

## FOREIGN MARKETS (ed)

If the Federal government can aid citrus growers to develop foreign markets for their products, such aid will certainly be welcomed by growers. Every shipment of citrus fruits to foreign markets will reduce by so much the visible supply which must be consumed in domestic markets and will tend to increase the domestic price in direct ratio to the diminished supply available for domestic consumption.

However, we believe that American citrus growers must continue to look for their principal outlet to American markets. Increasing production of citrus fruits in Asia, Africa and South America, all seeking foreign outlets and much of it produced at costs much lower than the production cost of American citrus, will operate to restrict the consumption of American grown citrus fruits to those foreign markets which demand the highest quality and which are willing to pay proportionately higher prices for such fruit. Such markets are limited, and while they may be developed by proper advertising and salesmanship, American producers will continue to be faced by the competition of other producing sections offering fruit at prices which we can ill afford to meet.

As we see it, the solution of our marketing problems lies in the production of the highest possible quality of fruit, inter-sectional control of distribution and persistent, aggressive and continuous campaign of publicity and education in our own domestic markets, letting foreign markets take care of our overflow.

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The owner of a valuable car or a valuable horse takes steps to protect it. The wise owner of a valuable grove does likewise.

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It costs less to take proper care of a grove than to rebuild one which has suffered from neglect.

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Cold protection for your grove may be a luxury nine years out of ten — but it is a life-saver on the tenth.

# REGARDLESS of PRICE or ANALYSIS COMPARE RESULTS

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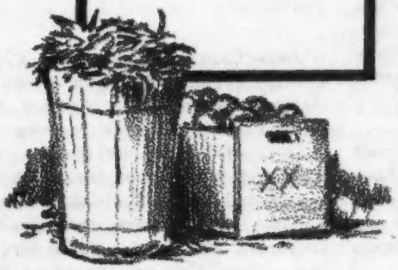

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# IMPRESSIONS

. . By . .
Frank Kay Anderson

Adventures of a Shrimp-Picker (continued from last issue): Well, we arrived minus the invitation but with a large and capacious void that craved shrimp; and either looked so hungry or something that no mention was made of the invitation that was supposed to have been enclosed in our letter but wasn't. So we were right on the starting line when Colonel (Ruby Lafoon) Joe Gentile Jr., said "Go!"

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About two hundred sat down at the feed set forth by the big citrus maggots. We were among the first, right along with Jack Lettice and B. M. Wherrette of Orlando. There were more shrimp and bigger shrimp than we ever saw before, plenty to wash them down and nothing to disturb. Even Fred Godfrey, when he made his speech as presiding elder of the Traffic Golf Assn., talked to an accompaniment of crunching shrimp, and a lovely time was being had by all. At our left were two vacant seats in the beginning. Later these were filled by a couple of traffickers who had been detained by a crap game or something, and they fell to along with us. Presently Jack Lettice, Wherrette and some others backed off, when the table had come out to meet their tummies, and quit. We were just getting well warmed up to the job, and beside it wouldn't have been polite to have left the late comers to eat alone (Mother took a lot of trouble to raise us right), so we just casually picked along. Then the late comers quit, and we were just about to call it off with the job only half done when we noticed a handsome gentleman across the table from us. It was the first occasion when we had taken time out to look around. He was still going merrily at full speed.

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Peering around the piled up shrimp shells in front of this gentleman we noted it was none other than the distinguished Frank Salisbury of the Louisville & Nashville R. R. self-evidently an old, experienced shrimp picker himself, evidently pointed and conditioned for this particular contest, and going strong. So we just strung along, keeping ready, as is always well in a distance contest, for a sprint at the finish. For our part we were going nicely when Bill Sharkey, in his capacity of head linesman, sent a couple of darkies with a little cart and they hauled away the shrimp shells piled upon the table between the Salisbury person and ourself, so that our view was no longer obscured and we had more elbow room.

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We bent over our oar and advanced the stroke to a swinging 38; but the transportation dignitary went up to about a 42, and in no time there was clear water showing between us. We wanted to go into a huddle, but there were none left to huddle with, so we began to throw laterals, but it didn't do any good. For sustained speed, accuracy, unlimited capacity and general enjoyment of shrimp-picking this Frank Salisbury is a real champion. He has just been wasting his time in the railroad business. We continued to jog along, doing the best we could, until we felt a stuffy feeling in our left ear. Laying off for a moment we investigated. Then we quit. Shrimp were beginning to ooze out of our ears. It was time to quit. Frank Salisbury continued right along, but after about three quarters of an hour more he too quit. Probably just lost interest in the absence of any competition.

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Now we had always rated ourself as a shrimp-picker; and in the bush leagues we have always made a pretty good showing. But this real big league shrimp-picker, is we are afraid, just a little too fast for us.

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Later while the mingling was taking place in the cool of the evening we spotted a shining dome in the distance surmounting something just a little too big for a man and not quite big enough to be a horse. It looked familiar. We strolled over, and sure enough it was our old college chum (Moler's Barber College, Kansas City) Bob Parks of Atlanta. We were reunionizing with him when R. B. Woolfolk came strolling by. "Come over here, Mr. Woolfolk," we called, and meet our Uncle, Mr. Parks."

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"Delighted to meet you, Mr. Woolfolk," caroled the rubicund Parks, "but don't pay any attention to the kidding. He's the biggest liar on earth. Why he was the cause of me getting the licking of my life as a boy. I was going down the street with father, and I waved and said, 'Hello, Frank!' Father didn't wait to get home. He just snatched me behind a nearby house and laid it on. When he had finished, he said: 'Let this be a lesson to you. Don't ever again let me hear you fail to accord respect to age. Don't you ever again address that gentleman except as 'Mr. Anderson.'."

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We've had a lot of fun out of the pastime over a long period, but guess we've just been a bush league kidder, too.

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So much for the shrimp party; but if you have a curiosity as to the parts that C. C. Commander, Lawrence Gentile, R. B. Woolfolk, W. H. Mouser, Chester C. Fosgate, I. N. Burman and Ed Asher played as hosts, we'll tell you. They paid the bills for the party, which, after all, is a useful function.

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John Ganzel, head of the Liquid Orange Products Co., one of the big Orlando commercial wineries, has figured it out that their concern pays a total of twenty-one licenses, permits and varieties of taxes. Then it is required to keep its books and so to conduct its operations throughout as to permit readily of a dozen sorts of inspections. Government, these days, certainly takes care that an infant industry doesn't climb the ladder too fast.

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Quite a movement on for setting up another Citrus Control Committee under sponsorship of the Triple-A, in order to make possible prorating of shipments and many other things which the State Citrus Commission cannot do. Then, following ascertainment that the Triple-A cannot see its way clear, thank you, to appoint the same eleven men to function in

federal capacity, the movement at this writing seems to have lost some of its original supporters.

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Following adjournment of the legislature Governor Sholtz told some citrus people he was going to make it his business to see that his appointees to the State Citrus Commission were strictly persona grata with the Triple-A folks at Washington, in order to provide for just such a contingency; but evidently there was a slip-up somewhere.

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Joe L. Gentile now carries the third generation of Gentiles into executive capacity in their fruit operations, with his recent elevation to have charge of grade and pack for the Tree-Gold packing houses.

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A tremendous increase last season in Florida's pack of grapefruit juice over that of preceding seasons, but word comes that California last year packed 400,000 cases of orange juice, an increase of 100,000 cases over 1933.

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T. H. Powell of the California Fruit Growers Exchange recently testified that the Exchange's percentage of the handling of the citrus crop was about 70 per cent, with the Mutual Orange Distributors handling about eleven per cent, and all other independents combining to handle 19 per cent. He ought to know; but if the lemons, of which the Exchange handles about 99 per cent, are to be deducted, that must mean the Exchange's percentage of the orange shipments must have shrunk in recent years.

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Quite a row out in California over the prorating question, with allegations that figures were twisted to work a hardship upon some. James Mills of the Mills Orchard Co., among others, out on the warpath because the prorate resulted in holding navels back and permitted Valencia movement in competition, when the showing was made that the acreage of Valencias has been increasing right along while there has been no increase, even a slight decrease, in navel acreage. Growers of navels solely, with no Valncia production, riled over the situation resulting from Valencias being allowed to overlap into what was long considered the navel season.

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Rube Garden sent us a prospectus for his Ideal Mountain Company. It was so interesting that we were reading it aloud to the family in the evening. A lot of fine ideas. Ideal Mountain to be located on some pasture land of Rube's in Levy county adjacent to the proposed canal. Ought to be God's gift to Florida. Stop all this running away to the North Carolina mountains in summer; save millions of dollars yearly in transportation alone for mountain-craving crackers.

---

Utilize the dirt to be removed from the canal, too, and permit its becoming an asset rather than a liability. Just think, a real 1,500 feet mountain. The one thing Florida has lacked. Besides the plans so interesting and practical. The first made-to-order mountain in history. All the advantages, and none of the disadvantages, of the ordinary or garden variety of mountain which mankind from time to time has tried to adapt to its uses.

---

A real corkscrew road from bottom to top with such easy grade that grandmothers may make it on roller skates. All terraced to avoid the waste land of an ordinary mountain, and to permit a maximum number of building lots and garden plots. Pick your location, southern exposures or north-front. Select your own preferred altitude. Choose your own view.

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Full view, too, of four of those great ten-million-dollar bridges that it is said will bring hundreds of thousands of intending suicides to Florida to make use of the wonderful facilities provided by these tremendous spans.

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Thousands of building lots, each fronting on the main road. A predestined architectural ensemble, under supervision of a Presbyterian architect, to avoid clash between Italian villas and Dutch Colonial cottages so frequently found in summer colonies.

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Thousands of beautiful summer homes, and each to be self-supporting through its own 4.6 acres of garden plot to be devoted to not raising hogs. It looked as if Rube had thought of almost everything.

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Then the carefulness of the set-up. the board of directors of the company to be composed wholly of very prominent deceased persons. Certainly it would be beyond criticism.

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The financing: So simple. And easy. Only necessary to purchase a certain amount of stock. Borrow the money from any bank if necessary, for each stockholder to be allotted an amount of Inverted Bonds equal to the stock subscription. The company to pay immediate cash to the amount of these Inverted Bonds to each subscribing bondholder.

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The proposed leasing of the snow concession at the top of the mountain, so as to provide free ice cream all summer to every home owner without need for metering the supply.

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Certainly a most thoughtful and practical undertaking, we opined. A real work of genius. We envied aloud Rube Garden's creative thought, his constructiveness.

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Why the creation of Ideal Mountain made even the canal desirable! And we, in our thoughtlessness, had been opposed to the canal, just because of a fear that it would increase the competition with our Florida grapefruit on the Atlantic seaboard through getting competitive grapefruit lower freight rates, and because of a fear for the safety of our fresh water supply.

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Short sighted! That was what we had been. What if the canal did interfere with our heretofore normal occupation? What if our well did go dry, and the lakes hereabout shrunk up? We'd have our summer home


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on Ideal Mountain about two-thirds the way up. We always did like just about one thousand feet of elevation. And we'd have a good view of one of the bridges, and with field glasses we could keep track of the day's score of suicides. Much simpler and easier than walking all over 36 holes, with some of these citrus shippers inclined to fudge in the sand traps.

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And, to think it out more completely, why couldn't we just stay on all winter in our self-supporting Ideal Mountain home? Pick a good southern exposure, and go right on not raising hogs all winter. Forget this business of making a living that has been taking up so much of our time for such a long period.

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We mentioned these things, and our family's enthusiasm was equal to our own. Friend Wife's enthusiasm was even greater than ours. "Think," she said, "of having that fine, clear, mountain water! I have always so enjoyed mountain water!"

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We said nothing. We couldn't say anything. We were tongue-tied. Paralyzed. Speechless. Somebody always is taking the joy out of life. Here was the marvel of the age, the most constructive creation within our reckoning. And a woman had wrecked it with a careless sentence! Why will women insist upon talking so much? We might at least have been allowed to go to bed unenlightened, and to have dreamed sweet dreams of our Ideal Mountain home and the unmetered ice cream. For, of course, there couldn't be any mountain water. At least not enough for any good purpose. The canal must drain the water right off, just as it will drain off the other water. Shucks!

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We haven't seen Rube Garden since; but we intend to shoot him on sight.

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Pausing at Vero Beach to sit in at a luncheon of the combined chamber of commerce and civic bodies, and a pleasant meeting with Sen. A. W. (Tony) Young. Few notables seem to hold the high regard of fellow townsmen that Tony Young noticeably commands.

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Our first visit to the McKee Jungle Gardens at Vero Beach, fortunately as the guest of Waldo E. Sexton who as one of the owners devised much of the plantings and improvements, and therefore made a splendid guide. Our first view of a Travelers' Palm, that when the base of one leaf is slightly separated from another by a knife blade pours out a small stream of sparkling clear water. The palm, we were told, will gather water simply from the dew in the absence of rain. It begins to look as if maybe there are ways out of the pickle in the event the cross-state canal is cut.

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Sanford and Sarasota can plant celery and travelers' palms alternately in the rows, and maybe find the answer to their water problems, while the reduction of acreage of celery due to the presence of the palms should obviate the need for control committees and prorates.

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Last winter, Waldo Sexton told us, five thousand tourists journeyed through the jungle gardens under the tutelage of guides and marveled at the more than one thousand different kinds of tropical and semi-tropical trees therein, not to mention the marvelous collection of water lillies and other things.

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At the conclusion of their tour of the gardens the visitors are turned loose on the orange juice. As much as one can drink for a dime. Last winter's record went to a peg-legged tourer who drank seven glasses, each of seven ounces capacity, standing up. Then took a seat and had another glassful.

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We note Irving S. Cobb gleefully telling the public of how he played the part of a dead horse in a recent parlor sketch with Charlie Chaplin. Tsh! Tsh! 'Tis nothing. Didn't we in our palmy young days once play the part of a cake of ice in a production of Uncle Tom's Cabin?

Florida State Plant Board

## PLANT BOARD URGES GROWERS TO BEWARE FAKE "TREE DOCTORS"

Beware of fake plant doctors. Once again the State Plant Board is issuing this warning to residents of Florida, following receipt of a letter from a Green Cove Springs woman in which she states that a Negro man came by her place and wanted to "take the blight out of her pecan trees."

His stock in trade was a curve-bladed saw and a packet of powder. His game was to bark the tree slightly on one side, apply the powder to the skinned place, and then throw dirt over it, all for the nominal sum of 85 cents per tree.

Although her trees did not have blight, the Negro treated three trees as a demonstration for the Green Cove Springs woman and then threated to "report her to Gainesville" for refusing to pay the full price asked.

Dr. J. H. Montgomery of the State Plant Board wrote the woman that the man is not outhorized by the State Plant Board to do such work, and that he knows of no state organization which is carrying on work of this kind. In fact, it is a 100 to 1 bet that the alleged treatment is absolutely worthless, and tree owners should not fall for the scheme.

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## INCREASE IN THREE CLASSES AT COLLEGE IS SHOWN BY FLOYD

Total enrollment of students in the sophomore, junior, and senior classes of the University of Florida College of Agriculture is 169, or 26 more than the enrollment of these three classes last year, reports Major W. L. Floyd, assistant dean of the college.

Under the plan of the General College, which was inaugurated at the University of Florida this year, all first year students must begin a general two-year course and complete this before they select their special or major courses of study. Thus, no freshmen are enrolled in the College of Agriculture this year.

As a result of changes and additions to the faculty, the College of Agriculture now offers a broader field of subjects and courses than ever before.

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## FARM OUTLOOK REPORT FOR FLORIDA IN 1936 WILL BE ISSUED SOON

A 1936 farm outlook report for Florida will be issued about December 1, following a conference of representatives of the U. S. Department of Agriculture, the AAA and state agricultural colleges in Washington.

An outlook report for the entire nation was released on November 4 and the state report will follow soon. H. G. Clayton, district agent with the Florida Agricultural Extension Service, represented Florida at the meeting in Washington.

The national report covered all major commodities, while the Florida report will cover the crops produced in this state.

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Farm wages are about 13 percent higher this fall than last and the supply of farm hands is about 95 percent of pre-war and the demand for labor 80 percent of pre-war, says the Bureau of Agricultural Economics.

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THEY learned that improper fertilization often resulted in fruit that was not uniform in size — sometimes too small — sometimes too large — but invariably fruit of the poorer grades. They learned, too, how a well balanced ration of the major plant foods, plus minor and secondary plant foods, could be made to literally work wonders. And all through the years, these skilled chemists — working in conjunction with men in the groves — have been seeing to it that Armour's Big Crop stood for the very best and most efficient in productive fertilizer.

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**The roots of citrus — or vegetables, for that matter — cannot of themselves continually find in the soil enough plant foods to build up resistance and adequate food reserve. It is up to you to see that proper plant foods are placed there (through fertilization) for the roots to utilize.**

Armour Fertilizer Works

**Jacksonville Florida**

Pumpkin Bugs

# Collecting Stink Bugs From Citrus

BY J. R. WATSON

Stink bugs, especially the southern green stink bug commonly called pumpkin bug by our growers, seem to be less abundant than usual this year. This happy result may be due in part to the unusually heavy rains of the past summer, since it has been our observation that heavy, dashing rains are rather an effective check on these insects. Also the feather-legged fly, the parasite which lays its eggs on the stink bugs and whose larvae feed on the internal organs, has been more abundant and effective this year than usual. This is probably the chief factor in the relative scarcity at the present time.

Late in the summer we spoke on the proper methods of guarding against an outbreak of these plant bugs in citrus groves, namely: to mow the cover crop not later than the middle of September. This is particularly important where the cover crops are chiefly legumes, like beggarweed, cow peas, velvet beans, **Crotalaria striata**, etc. Where this has been done and done carefully we seldom find an outbreak of pumpkin bugs. However, in spite of the comparative scarcity of pumpkin bugs at the present time, our growers should be on guard against an outbreak. As the cover crops, particularly legumes, ripen and dry out, as they are now doing, and become unattractive to the bugs, the latter are liable to attack citrus fruit. Their distribution is often very spotted, one grove may be heavily infested while neighboring groves are comparatively free. The citrus fruits will be endangered in direct proportion to the thinness of the rind, as well as to the state of maturity. Those varieties with very thin rinds, such as satsumas, tangerines, etc., are most apt to be attacked. Next come thin skinned varieties of oranges, like pineapples, Hamlins, Parson Browns, etc. Valencias and particularly grapefruit are usually not much troubled by the pumpkin bug.

However, if because of the neglect of the cover crop or the migration from neighboring fields, a citrus grove gets a heavy infestation of these insects on the fruit, it is not necessary for the grower to fold his arms and let the bugs destroy the crop, as they surely will if sufficiently abundant. A fruit heavily attacked will promptly drop. One less severely injured may stick but since the punctures of these bugs make avenues of entry for fungus diseases, it will be almost sure to break down on the way to market.

The bugs can be collected at a cost of only a few dollars per acre, a very small fraction of the value of the fruit they may destroy. For this purpose the best plan is to construct some shallow nets out of muslin cloth which may be strung on a telephone nets should be at least two feet in wire fastened to a short handle. These nets should be at least two feet in diameter. Go into the grove in the early morning when the bugs are sluggish, or on a moonlight night and shake the bugs off into these nets, first placing in the bottom of them some cotton waste or similiar material, dipped in kerosene, which by rolling around in the nets will get the insects thoroughly wet with kerosene. To keep this wet and to kill the bugs promptly, the net should be dipped in a bucket containing kerosene after each tree has been treated. Bugs so treated may crawl out of the nets but will invariably die in a short time.

Some growers collect the bugs at night by means of flash lights. The reason that it is particularly advantageous to collect them at night is that if collecting is attempted during the day time when the weather is warm they are very apt to fly away and escape. At night and in the early morning they are sluggish and very much less inclined to fly. On moonlight nights these bugs, resting on the yellowish fruit, are quite conspicuous and rather easily located, but on very cold nights they have a tendency to crawl down under the foliage and protected places where they are not so easily seen.

Although this method of dealing with the bugs sounds slow and tedious it really will cost but a few dollars per acre. In one grove where careful account was taken of the time spent in collecting, the cost was somewhat less than $2.00 per acre. This was on twelve year old trees. Of course, as the trees get larger the expense will be greater, but not in proportion to th size of the tree as most of the bugs will be found on the lower branches.

Growers frequently inquire as to a possible spray against these insects. Although the soft-bodied young can be killed by various sprays, particularly some of the pyrethrum sprays, we know of no spray which will kill the full grown bugs which will at the same time be safe to use on citrus trees. Some growers have used a spray of kerosene, in a very fine mist, without serious injury to the trees. Others have received serious injury from the attempted use of this spray. It is not a safe thing. Even if we had a safe and effective spray for these insects the cost would be greater than collecting them in nets as we have described.

Illustrations and directions for making these nets will be found in Extension Bulletin No. 67 of this Station. Growers who do not have this bulletin can obtain one from the Agricultural Extension Station, at Gainesville, or from their County Agent.

Growers, instead of having to collect these bugs themselves, can sometimes manage to have the collecting done free. Among these free collectors are the various forms of poultry.

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Chickens in a citrus grove are enthusiastic collectors of insects and since, as stated above, most of the stink bugs are found on the lower branches they are usually quite effecting in preventing an infestation, particularly if they have the run of the grove during the summer and can collect the young bugs on the cover crop before they get on the citrus. Larger groves which are not likely to be covered by the rather limited roving activities of chickens may be effectively covered by turkeys and guineas. In fact these fowls are very effective controllers of many insects, not only in orange groves but in farms in general.

Spencer A.P

### A. P. SPENCER HEADS HONORARY SOCIETY OF EXTENSION WORKERS

A. P. Spencer, vice-director of the State Agricultural Extension Service, Gainesville, has been elected chief of Epsilon Sigma Phi, honorary society composed of veterans in extension work. He succeeds William Gomme, county agent in Pinellas, who has directed the destinies of the organization for the past year. The society's annual meeting wes held in connection with the annual conference of county and home demonstration agents recently at the College of Agriculture.

Mr. Spencer has been connected with extension work in Florida for 22 years, serving first as district agent and for the past 14 years as vice-director and county agent leader. He is a charter member of the Florida Chapter of Epsilon Sigma Phi, which was founded here several years ago. Its membership is composed entirely of men and women who have been connected with extension work for 10 or more years.

Other officers of the Florida chapter for 1936 are: Secretary-Treasurer, Miss Ruby McDavid, district agent with the State Home Demonstration Department in Tallahassee, analyst, Miss Pearl Laffitte, home agent in Duval County.

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John W. Friesnes, graduate assistant in horticulture, with the University of Florida College of Agriculture, Gainesville, has resigned to accept a position with the state citrus packing house inspector, Major W. L. Floyd, assistant dean of the college, has announced.

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Plant Breeding

# Some Results Of Plant Breeding In Florida

BY P. H. SENN, ASSOCIATE PROFESSOR OF FARM CROPS AND GENETICS,
COLLEGE OF AGRICULTURE, UNIVERSITY OF FLORIDA, GAINESVILLE

In this paper we will not attempt to give a complete list of plants developed through breeding in Florida, but we will present representative individuals from certain groups of plants that will indicate some of the contributions of plant breeding to improvement of the economic plants of our state.

In the beginning, let us understand that plant breeding deals with the improvement of plants by two general methods. Hybridization and selection. The modern plant breeder uses both methods. Hybridization involves the crossing of plants that differ in certain characteristics in the hope that new combinations of desirable characters may be produced. This method holds forth great possibilities for improvement among plants.

Hybrids are often very unstable; that is, they tend to break or split up into various forms and types, some of which might be desirable, others less so. Here is where selection comes in. Selection is the picking of certain of these types that are desirable and growing them in the hope that they may be more stable and later become a new variety.

Let us consider first some of the contributions of plant breeding among the citrus fruits of Florida.

The variety of orange known as the Lue Gim Gong is the product of the labors of a plant breeder of the same name. Lue Gim Gong was a plant breeder and horticulturist, a native of China, who lived near DeLand, Florida. He crossed two varieties of orange, Hart's Late, now known as Valencia and Mediterranean Sweet. He used hand pollination methods and his work was done in 1886. Through the production of the Lue Gim Gong variety of orange, we have one of our very latest varieties, which has the characteristic of hanging on the tree even from one season to the next, thereby extending our market season late into the summer.

The Temple Orange is another variety of outstanding importance in our state. It originated at Winter Park, Florida, and was produced by hybridization.

Other contributions made by plant breeding in the field of citrus have been the products of hybridizing different types of citrus fruits. The Limequat has been produced by crossing the Lime with the Kumquat. An outstanding variety is the Eustis. It resembles the lime parent in habit of producing its crop, in that it blooms several times throughout the year, thereby extending its season of production. Its foliage, however, resembles the kumquat parent.

The Parine Lemon which is now being rather extensively grown in areas around Babson Park, Florida, originated as a cross between the Mexican Lime and the Lemon. The Parine Lemon is a promising product. It has good quality and is well suited to Florida conditions.

The Citrange has been produced through the hybridization of the Round Orange with the common or oridinary trifoliata. Out of such hybridizations have come such well known varieties of Citrange as Rusk and Morton as well as a number of other varieties. The varieties differ in many respects. Some have the evergreen foliage like the round orange parent, while others have the foliage of the trifoliata parent. The fruits show little resemblance to either parent.

The Citrange has been used in further hybridization work. It has been crossed with the kumquat. From this has come the Citrange-quat. The Thomasville, Sinton and Telfair are well known varieties of Citrange-quat some of which are very hardy.

The Tangelo fruit has resulted from crossing the grapefruit with the Tangerine. Out of this have come such varieties as Thornton, Sampson, and others, varying in size, color and general qualities.

Breeding work with watermelons will serve as an example among the truck crops. As is well known, watermelons of practically all varieties of commercial importance are susceptible to a disease known as wilt. During the past few years, intensive breeding and testing have been carried on with the watermelon by the Florida Agricultural Experiment Station in an effort to overcome this trouble. Out of the commercial variety known as Kleckley Sweet, has been developed by breeding methods, a melon that is highly resistant to the wilt organism. At the same time the market requirements have not been overlooked. The flesh is of uniform quality and color, and the melon is of the shape desired by the shippers.

Through the efforts of the plant breeder, some interesting contributions have been made to our list of varieties of field crops. Some years ago the tobacco industry in north and northwest Florida was threatened by a disease known as tobacco wilt. Breeding work was undertaken at the North Florida Experiment Station at Quincy, in the center of one of the tobacco producing areas of the state. Two varieties, one known as Big Cuba and the other as Little Cuba, were crossed, and out of this cross has come the variety known as Number 301. This variety is now grown extensively in the tobacco fields of Florida. Not only is it highly resistant to the disease, but the size, shape and quality of the leaf have met the market demands in a very admirable manner.

A number of years ago, the Velvet Bean was introduced into Florida. At first it was used only for shade around porches. Later it was tried in the fields and found to be desirable as

**1. Can You Answer These?**

2. If it is possible to test for the availability of the plant foods contained in a bag of fertilizer, isn't it possible to test for the availability of the same elements in a bag of soil?
3. Isn't it equally logical to know the availability of the plant foods in the soil as well as in the bag of fertilizer?
4. Hasn't it been shown that proper soil conditions promote maximum resistance of citrus trees to cold and drought?
5. Is it not the only way that you can consistently produce quality citrus at reduced cost?
6. What organization in the U. S. — other than State and Federal — has made the most thorough study of soils?
7. What organization is better prepared than ours to handle YOUR particular problems?
8. Isn't the answer to these questions necessary for the assurance of your success and ours?

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a forage crop as well as a soil builder. Breeding work was undertaken by one of the Experiment Station plant breeders. Out of the crosses have come a number of different varities, different in many ways, such as time of maturity, habit of growth, size, color, and shape of seed.

A new varity of Cowpea has been developed by the Florida Experiment Station breeding staff. The new plant has been named Suwanee cowpea. This new variety possesses characteristics of growth and production, as well as disease-resistant qualities, that place it in the forefront as a variety for growing in the state of Florida.

Considerable plant breeding work is being done at the present time with corn in Florida. The Florida Experiment Station has recently developed and released two new varieties of sweet corn. One of these newly dveloped varieties is Suwanee Sugar, which is the result of crossing

(Continued on page 22)


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## Florida Brogdex Distributors, Inc.

B. C. SKINNER, Manager DUNEDIN, FLORIDA

## A GENERAL SURVEY OF FLORIDA SOILS

(Continued from page 5)

soils, though limited in extent, have a higher natural fertility because of the limestone origin, and compact characterized by a gray to chocolate residual underlying clay. They are brown surface overlying a red to brown sand clay which usually contains chert and limestone residues. These soils are inherently more productive than the Norfolk soils.

In north central Florida, including, Alachua, Suwanee, Levy, Gilchrist, Hamilton and Columbia counties, the upland soils consist of Norfolk, Hernando, Gainesville and Hoffman fine sands and sandy loams. The Hoffman soils differ from the Norfolk in having a compact yellow sandy loam under the surface layer. This overlies a stratum of pink and red sandy clay. All of these soils are used for general farming purposes with a limited amount of truck crops. As a rule the sandy loams are more desirable for farm purposes because of the less leaching and greater plant food reserve. Here again the Gainesville and Hernando soils, tho limited in extent, are better suited for farm purposes than are the Norfolk soils.

In the Western counties, the upland soils consist primarily of Norfolk, Orangeburg, Ruston, Tifton and Gainesville fine sands and sandy loams. The Greenville soils are known as the deep red soils while the Orangeburg and Ruston soils have a grayish brown surface, 6 to 8 inches deep, overlying a red to reddish brown sandy clay. The Tifton soils are commonly known as pebbly soils, otherwise they are similiar to the Norfolk soils. The sandy loams and fine sandy loams of these soil groups constitutes the best farm land in West Florida, being grown to corn, cotton, sugar cane, shade tobacco, peanuts and other crops. The sands have a very little crop value in this section of Florida. The Tifton soils seem to be our best cotton lands. The Orangeburg and Rustn soils lead in the production of shade tobacco. The Norfolk soils which are the most extensive are used more for general farm purposes.

The soils having a medium to fair drainage in West Florida consists of the Kalmia, Gadsden and Cahaba sandy loams. The Susquehanna and Blanton fine sands in North Central Florida, with Fellowship, Blanton and Scranton fine sands and sandy loams in the peninsula. The Kalmia and Gedsden soils are similiar to the Norfolk soils in color, but occur along streams as second bottom and alluvial deposits. They have a crop adaptation similiar to the Norfolk soils. The Cahaba soils are also of river terrace origin, but are similiar to the Orangeburg types in color and crop adaptation. The Susquehanna fine sands occur mainly in Suwanee county. They consist of gray sand somewhat similiar to the Norfolk sands for 10 to 40 inches in depth. This passes abruptly into a heavy plastic clay which varies in color from a brownish red to a yellowish brown. The soils are naturally moist and may be grown to a number of farm crops when properly managed. They are inherently poor. But the impervious clay retards the loss of plant nutrients as well as water. The deep phases are grown to bright tobacco, corn and other crops, with a fair degree of success. The Blanton soils are quite general in the peninsula, and resemble the Norfolk soils except for the splotched white and yellow color in the subsoil. They are usually cold, and are not very well suited to citrus.

The Scranton fine sands and Fellowship fine sandy loam constitute some of Florida's best truck soils. They both have a dark gray to black surface, underlain with a yellowish fine sand in the Scranton types and a mottled plastic clay in the Fellowship types. The Scranton fine sand is the best grade of Strawberry soils in the Plant City area, while the Fellowship soils represent the best all round truck lands in central Florida.

The Lakewood, Palm Beach, St. Lucie and Dade sands owe their crop value to their location along the coast. The Palm Beach sands are characterized by their speckled appearance due to the presence of shells, while the Dade sands are characterized by the underlying Calitic lime rock. The Lakewood soils contain an orange colored sand at 20 to 40 inches below the surface. The St. Lucie sands are bright gray sand dunes, with a very scrubby vegetation.

The poorly drained soils consist in a large measure of the Portsmouth, Leon, Bladen, Plummer and Parkwood fine sands and sandy loams. The crop value of these soils are dependent on the control of water. The Portsmouth soils are perhaps the most widely distributed, poorly drained soils in the state. They consist of a block moist surface, overlying a gray to white sand or sandy clay. When drained the Portsmouth soils are adapted to a variety of farm and truck crops, but due to their low lying position even in the peninsula, they have poor air drainage, and are not adapted to the production of citrus. The Leon sands and fine sands, commonly known as hardpan lands, as well as scrub palmetto lands, have no crop value except where water can be controlled, as is done for celery in the Sanford area. They have a gray surface underlain with an impervious hardpan. These soils represent the most extensive flatwoods soils in the state. Outside of the Sanford district they have no value except for forest and game preserves, with a limited amount of grazing. The Plummer soils also occur in the flatwoods areas, and are sometimes known as Crayfish and again as "quick sand" lands. They have no value except for forest and grazing. On the other hand the Bladen soils, known as grassy flatwoods, represent one of our best truck and grazing soils in the state. They have a gray surface underlain with a mottled and plastic sandy clay. They occur main-

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ly in the St. Johns river valley, but includes part of Baker and Nassau counties. They are known as potato lands. The underlying clay enhances their values because of its high storage for water and fertilizer nutrients.

The Parkwood soils, known as marl lands, are also very good for truck lands. They are limited in extent, occuring in low areas in the limestone section. The surface is gray to black in the more developed types. This overlies a marl at 3 to 15 inches in depth. The marl along the lower east coast contain only a thin surface layer. When drained the Parkwood soils are inherently productive, being adapted to wide variety of truck crops, and even citrus where the air drainage is good. The Peat and Muck soils, though not extensive, except in the Everglades, rank high for truck and farm crops, when properly drained. Their crop value is due largely to their high content of nitrogen and water capacity. Their capacity for crop production has not been fully realized.

To summarize, it would seem not only reasonable, but an act of wisdom, to reserve such soil groups as the Scranton, Orlando, Hernando, Parkwood, Fellowship, Bladen, Tifton, Gainesville, and the level phases of Orangeburg and Greenville and the Norfolk fine sands in the peninsula and sandy loams in the Western counties, as well as the Peat and Muck deposits, for agricultural crops in the future, because of their inherently natural fertility, and limited acreage. The represent our most productive soils. But such soils as Leon, sand and fine sand, Plummer, sands and fine sand, Portsmouth sands and fine sands, St. Johns sands and fine sands, St. Lucie sands and Norfolk and Blanton sands in West Florida, all of which are not suited to the production of crops under their natural condition, but comprise a very large part of the state's area and might properly go to forest, game preserves, recreational grounds, and grazing purposes. Thus we may see that our citrus, strawberries, potatoes, tobacco, and other crops are suited to a limited acreage of soil types in the state, and if the directing agencies will take these broad principles into consideration in formulating a land use policy for Florida, giving due consideration for our inherent land values, her people will not only grow in prosperity but in joy and happiness as well.

C. D. Kime
Consulting Horticulturist
Grove Advisory Service, Soil Investigations, Research.
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ORLANDO

## PLAN AND PURPOSE OF FLORIDA'S AGRICULTURAL SCHOOL OF THE AIR

(Continued from page 9)

plified and of greater general interest. It is believed that a person who listens regularly will have a pretty good understanding of the state's agriculture after the series is concluded.

For instance, one of my listeners today may be an expert corn grower but may not know a whole lot about citrus or the citrus industry. Again, another listener may be a city resident who has eaten numerous oranges but never has known just why or how an orange is grown and sent to market. Again, the orange grower may have very shallow knowledge about the production of pecans, or the growing of corn.

The talks in this school of the air are aimed to give a concise summary of the whole field of Florida agriculture, and to present it in such a way that it will be of interest to all listeners, whether or not they are farmers. Naturally, the talks will be concerned with the different topics in general and cannot go into detailed directions for the fertilizing of citrus trees or the planting of corn or cotton.

This school "curriculum" began with a talk by Dr. O. C. Bryan, professor of agronomy and soils in the College of Agriculture, and will continue through October and all or most of November. As stated before, there will be one talk in the series during every Farm Hour program except on Saturday.

The series will begin with the foundation of all life, both plant and animal, that is, the soil. It will progress to plants, livestock, poultry, insects and miscellaneous matters.

If you are interested in obtaining a copy of the October program for the Florida Farm Hour, which lists these topics by days, just drop a card to this station, WRUF, Gainesville, and request it. A printed copy will be mailed you without delay.

And in the meantime, we feel sure that you will be missing something if you fail to attend this "school of the air" class which will be held during the Farm Hour. You don't need to register, and there will be no examination, but classes will be held every day.

Voorhees, R. K.

## FLORIDA WORKER TAKES GRADUATE COURSES AT MINNESOTA UNIVERSITY

R. K. Voorhees, assistant plant pathologist at the Florida Agricultural Experiment Station, in Gainesville, has obtained a fellowship in plant pathology at the University of Minnesota and is pursuing work for the doctor of philosophy degree, it is announced by Dr. Wilmon Newell, director. He has been granted a year's leave of absence from the Experiment Station.

Mr. Voorhees is studying under Dr. E. C. Stakeman, internationally famous plant pathologist.

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## SOME RESULTS OF PLANT BREEDING IN FLORIDA

(Continued from page 19)

the Long Island Beauty Sweet corn with a commonly-grown roasting ear variety known as Snowflake. The new variety possesses a very desirable ear size; it yields well and it shows a high degree of resistance to the corn worm. This new variety of sweet corn holds much promise as a trucking corn for shipping purposes.

Another sweet corn is known as Florida 191, a sweet corn developed by breeding. This is a variety suit able for home garden use.

Sugarcane breeding is carried on in Florida in the Everglades section. Here the plant blooms and hybridization methods may be practiced. Thousands of crosses have been made in an effort to bring about improvement of sugarcane varieties. Already sugarcanes have been produced and are now being given final tests before being released to the growers. Some have been developed that show a high prcentage of sugar in the juice. These will be found excellent for sugar production. Others are being developed for syrup purposes. Some of the varieties produced are giving promise as suitable forage plants for feeding livestock. There are still other varieties, the result of breeding, that are tender and will probably be popular as a cane for chewing.

Some plant breeding work has been accomplished among the ornamental plants. One example will be mentioned, that of the fancy-leaved Caladium. These plants originally came from Para on the Amazon. They are probably the most brilliant and fascinating of foliage plants. There are a number of wild species differing in size of leaf and presenting many colors. The late Dr. Henry Nehrling through breeding methods starting with the wild species, developed Caladiums of marvelous colors in every combination of shading, edging and spotting.

The examples I have mentioned do not by any means represent a complete list, but they will serve as an index to the part the scientific plant breeder is contributing to the improvement of our economic plants.

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CAUSERIENCE LEPIDOFLOIA — (So-called Brizilian oak), resembles Australian pine. Grand for windbreaks. Cold resistant. Beautiful. Send for sample of foliage. $6.00 per 100. S. F. Matthews, Homestead, Fla.

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CROTALARIA — New crop, high quality, double cleaned, scarified Crotalaria Striata seed for sale. Attractive prices. Carolinas' Crotalaria Co., Camden, S. C.

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Large citrus trees for replanting at special low price. Grafted avocado trees and budwood of Perrine lemon and Tahiti limes.
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MEN WANTED—Sell Shirts. No experience necessary. Free samples. Commission in advance. Free ties with shirts. Carroll Mills, 875A Flatbush Av., Brooklyn N. Y.

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POSITION WANTED — Managing, caring for citrus grove, for good, reliable party. Highest type reference gladly furnished. H. A. KUTER, Elkton, Fla.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

FREE Booklet describes 87 plans for making $20-$100 weekly, home or office, business your own. Elite Service, 505 Fifth ave., New York City.

CLEOPATRA MANDARIN and Sour Orange rood stock. Also Hamlin, Valencia and Persian Lime budded trees. Grand Island Nurseries, Eustis, Fla.

WANTED—To hear from owner having good farm for sale. Cash price, particulars. John Black, Chippewa Falls, Wisconsin.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship. Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

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Orchard Heaters

# Demonstration Proves Heater Efficiency In Cold Weather In Texas Groves

Orchard heating has not been a general practice in the Texas citrus areas, some of the attempts having been unsuccessful, but the satisfactory results of recent work have led observant growers to believe that the possibilities of this defense against cold have not been adequately tested here and that heating may prove to have a large measure of effectiveness against freezing winds from the North.

During exceptionally low night temperatures in January, when the mercury sank to 23 degrees, about fifteen hundred heaters were lighted on twenty-four acres of citrus in Engelman Gardens, and J. F. Wood, horticulturist of the Experiment Station, was on hand to make observations and an official report. There was approximately one heater for each tree. Most of them were oil burners, though the fuel for a few was coke. The wind was high, ranging in velocity from twenty to thirty miles an hour—a condition which often prevails during cold waves in this climate and which has been considered the main difficulty in attaining success with heaters. The wind is supposed to blow the heat away too rapidly.

This, however, was not the case during the January operations, nor in others in February when the heaters were lighted again to combat wintry blasts which were not as severe as in January but were destructive of blossoms in many orchards. It was found that the heaters raised the general orchard temperature by from six to ten degrees—enough to prevent defoliation and to save the fruit. Some of this was frozen nearly to the center where the trees had no protection, while on those in the heated area even the blossoms were unharmed. The contrast between the appearance of heated and unheated trees on the days following the cold weather was striking and significant. The former showed no indications of having been subjected to anything but balmy breezes, while many of the latter looked like fruit trees in the winter in the North.

Horticulturist Wood has not yet written his official report on his observations, but he has said informally that physically the operations were successful beyond his expectations. Adjacent to the heated orchard on the southeast, in an area where there were no heaters, the effect of the warmth and smoke, carried by the wind in that direction, was plainly visible in the comparatively undamaged condition of many of the trees.

The economic aspect of orchard heating in the Lower Valley is an important phase of the matter which Mr. Wood intends to analyze with care. The oil burners hold nine gallons of fuel, and under efficient operation this supply will last for nine or ten hours, that is, the consumption is about a gallon an hour per heater. The cost of the crude petroleum from the Fordyce field used in the work was three cents a gallon, making the cost per hour about forty-five dollars for the fifteen hundred heaters. In addition to this there is, of course, an expense for labor.

For a ten acre grove, or say seven hundred trees, protected by seven hundred heaters, the fuel cost at three cents a gallon would obviously be twenty-one dollars an hour, with a probable total of twenty-five dollars and $250 for ten hours. If even several times this amount should save the crop it would, of course, be an expenditure well worth making when the market situation is satisfactory. Numerous growers are showing much interest in orchard heating.

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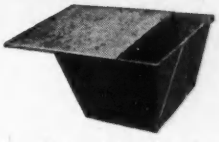

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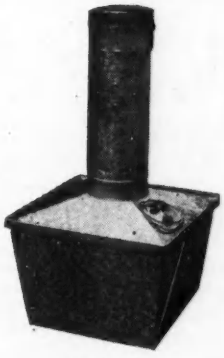

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# Features In This Month's Issue

The Citrus Outlook For 1936
U. S. Bureau of Agricultural Economics

A Winter Clean-Up Campaign Against Aphids
By J. R. Watson

The Growers Own Page

Working For F. O. B. Market
By J. R. Yearwood

Our Farmers
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Editorial
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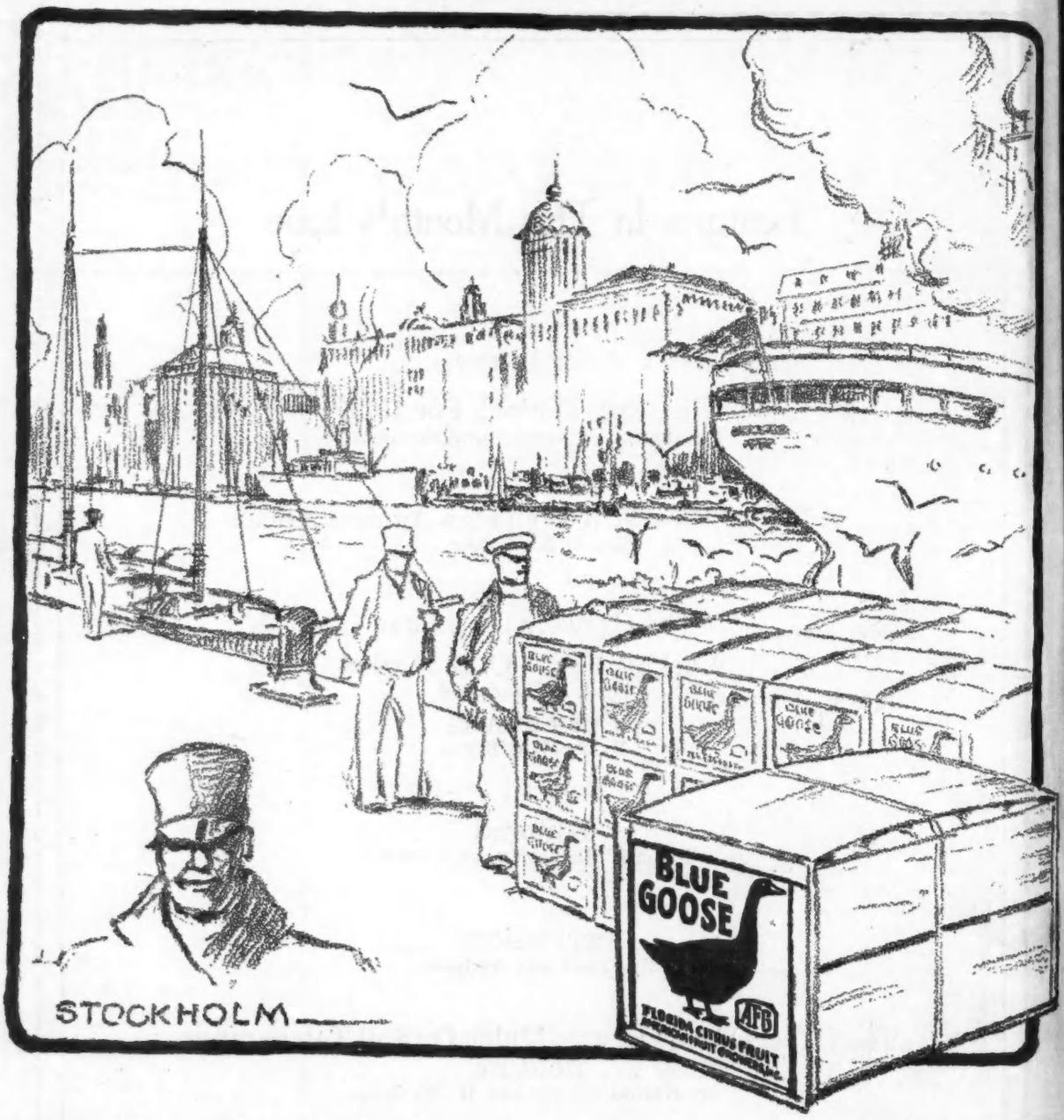
Impressions
By Frank Kay Anderson

The Effect Of An Organic Mulch On Soil Temperature-Moisture
By Harold Mowry and H. W. Jones

Insecticides To Control Florida Insects
By J. R. Watson

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